

Serial No.: 09/586,484

**REMARKS/ARGUMENTS**

This application has been reconsidered carefully in light of the Office Action dated as mailed on 25 November 2003. A careful reconsideration of the application by the Examiner in light of the foregoing amendments and the following remarks is respectfully requested.

5                    This response is timely filed as it is filed within the three (3) month shortened statutory period for response to the outstanding Office Action.

                    This response is also accompanied with a check and/or authorization to charge deposit account for any additional claim fee due as a result of this Amendment because the number of independent claims exceeds the number of independent claims  
10                   for which fees have previously been paid, the total number of claims exceeds the total number of claims for which fees have previously been paid, or both.

**Amendment to the Claims**

By the above,

1.            Claims 5 and 8 have been rewritten to improve their form and to  
15            make more clear the invention which Applicant regards as his invention,

2.            Claim 13 has been rewritten to correct word processing errors which became evident on further review of the previously rewritten claim, and

3. Claims 27-29 have been added to more fully and completely claim the disclosed subject matter.

More particularly, claim 5 has been rewritten to require that the gas diffusible containment member within the elongated hollow tubular member, directly  
5 adjacently surrounding at least a portion of the supply of pyrotechnic gas generant material. Such placement or positioning of a gas diffusible containment member finds support in the application such as in FIGS. 2 and 3 as well as at page 16, lines 3-21, for example.

Claim 8 has been rewritten to require that the elongated diffuser device  
10 have first and second opposed lateral ends and also have first and second longitudinal ends. Such limitation finds support in the application such as in FIGS. 1-3 and page 20, lines 5-8, for example.

Newly added claims 27-29 also find general support throughout the originally-filed application. For example, the claim 27 limitation, that the elongated  
15 diffuser device and the inflator are secured together at at least one location between the first and second lateral ends of the elongated diffuser device, finds support in FIG. 1 and page 18, line 15 through page 19, line 2, for example. The claim 28 and 29 limitation that the discharge treatment element has first and second opposed lateral ends and also has first and second longitudinal ends, finds support in the application

such as in FIGS. 1-3 and page 20, lines 5-8, for example. The claim 29 requirement that, in a static state, the first and second longitudinal ends of the discharge treatment element contact the tubular member, and upon activation, the first and second longitudinal ends of the discharge treatment element deform away from the tubular member to form spaced apart gas flow paths extending: 1) between the tubular member and each of the first and second longitudinal ends of the discharge treatment element, and 2) into the inflatable device, finds support such as at page 20, line 15 through page 21, line 7, for example.

Claims 1-9, 11-19 and 21-29 remain in the application.

### **Claim Objections**

Claim 13 has been objected to for lack of clarity.

As identified above, upon further review, word processing errors apparently occurred in the presentation of claim 13 in the preceding amendment document. By the above, such word processing errors have been sought to be remedied. In view thereof, the withdrawal of such basis of objection is respectfully requested.

**Claim Rejections - 35 U.S.C. §103**

1. Claims 7-9, 11-19, 21 and 23-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,176,517 to Hamilton (hereinafter “Hamilton”) in view of U.S. Patent 5,482,9315 to Chandler Jr. et al. (hereinafter “Chandler”).

It is initially noted that Hamilton and the subject application have the common assignee, Autoliv ASP Inc. Also, as previously noted, both Chandler and the subject application are commonly assigned; Chandler was included in the art originally cited in the Information Disclosure Statement which accompanied the subject application on its filing; and Chandler, on which the undersigned is one of the indicated attorneys, was considered in the preparation of the subject application.

With regard to claim 7, the Action, after acknowledging that Hamilton does not specify the tube having a length-to-diameter ratio greater than 20, as required by claim 7, relies on Chandler as showing an inflator with a length-to-diameter ratio of “at least 12.5” and alleges that this feature is application dependent, does not affect the proper operation of the invention and that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to include this ratio, as exemplified in Chandler, to suggest the scope of applicability.”

Such rejection is respectfully traversed.

Claim 7 requires an inflator comprising:

an elongated hollow tubular member containing an elongated supply of pyrotechnic gas generant material reactable to produce a supply of gas, the tubular member having a length to diameter ratio greater than 20 and including a plurality of longitudinally-spaced apart gas exit orifices wherethrough at least a portion of the supply of gas provided by reaction of the pyrotechnic gas generant material can be expelled from the tubular member, wherein the elongated hollow tubular member is arcuate.

Such an inflator is neither shown nor suggested by the proposed combination of Hamilton with Chandler.

As stated in Chandler, the invention thereof “is a hybrid (augmented) stored gas inflator 10 for air bag restraint systems. The inflator 10 comprises an elongated slender tubular shaped cylinder 50 for storing inert gas such as argon or nitrogen under high pressure, for example at 2000 to 4000 psi.” (See Chandler, col. 2, lines 12-17, emphasis added.)

Thus, it is clear that the tubular shaped cylinder of Chandler stores or contains an inert, pressurized gas as compared to an elongated supply of pyrotechnic gas generant material reactable to produce a supply of gas, as claimed. In this regards it is noted that the subject application specifically discusses problems (e.g., uniform ignitability) and limitations on or with pyrotechnic inflators and that such inflators commonly have an L/D ratio of no more than about 7. Claim 7 requires that the

Serial No.: 09/586,484

claimed inflator contain an “elongated supply of pyrotechnic gas generant material” not merely an elongated supply of gas generant material.

The Action has failed to identify a proper basis for combining the teachings of Chandler (and which teachings, as identified above, are specifically directed to an elongated slender tubular shaped cylinder for storing inert gas) to or with the gas generating apparatus of Hamilton.

Moreover, claim 7 also requires that the elongated hollow tubular member be arcuate. Arcuate elongated tubular members are identified and specifically disclosed, described and discussed at various locations in the specification. For example, the invention practice or use of inflator having an arcuate form or profile is specifically identified at page 15, lines 6-9; page 22, lines 4-10 and page 22, line 19 through page 23, line 4 and shown in FIGS. 6 and 7, for example. Such an arcuate elongated hollow tubular member is nowhere shown or suggested by Hamilton or Chandler.

As stated in the previously provided definition of the term “arcuate” appearing in The American Heritage Dictionary of the English Language, Houghton Mifflin Company, 1981, arcuate means “having the form of a bow; curved; arched.” Again, such an arcuate elongated hollow tubular member is nowhere shown or suggested by Hamilton or Chandler.

Still further, claim 7 requires that the tubular member of the inflator thereof have a length to diameter ratio **greater than 20**. As acknowledged in the Action, Chandler discloses that the cylinder thereof has an L/D ratio of “at least 12.5.” Chandler does not show or suggest the incorporation and use of a cylinder having  
5 an L/D ratio greater than 20, as claimed. While the Action alleges that 1) length-to-diameter ratio is application dependent, 2) does not affect the proper operation of the invention and 3) “it would have been obvious to one of ordinary skill in the art at the time the invention was made to include this ratio, as exemplified in Chandler, to suggest the scope of applicability,” the very reference relied on by the  
10 Examiner (i.e., Chandler) describes an L/D ratio of a stored gas chamber, **NOT** “an elongated hollow tubular member containing an elongated supply of pyrotechnic gas generant material reactable to produce a supply of gas”, as required by claim 7.

In view thereof, claim 7 is believed patentable over the art of record and notification to that effect is solicited.

15 Claims 8 and 13 are independent claims directed inflation assemblies including an inflator such as generally set forth in claim 7 and also including either a specified elongated diffuser device (claim 8) or a specified elongated discharge treatment element (claim 13).

Claim 8 requires an inflation assembly comprising:

5 an inflator comprising an elongated hollow tubular member containing an elongated supply of pyrotechnic gas generant material reactable to produce a supply of gas, the tubular member having a length to diameter ratio greater than 20 and including a plurality of longitudinally-spaced apart gas exit orifices wherethrough at least a portion of the supply of gas provided by reaction of the pyrotechnic gas generant material can be expelled from the tubular member and

10 an elongated diffuser device secured adjacent the inflator for directing at least a portion of gas expelled from the inflator into an associated inflatable device, the elongated diffuser device having first and second opposed lateral ends and also having first and second longitudinal ends.

15 Thus, claim 8, similar to claim 7, requires an inflator comprising an elongated hollow tubular member containing an elongated supply of pyrotechnic gas generant material reactable to produce a supply of gas, the tubular member having a length to diameter ratio greater than 20 and including a plurality of longitudinally-spaced apart gas exit orifices wherethrough at least a portion of the supply of gas provided by reaction of the pyrotechnic gas generant material can be expelled from the tubular member.

25 As submitted above, Hamilton in view of Chandler fails to show or suggest such an inflator. In particular, Hamilton in view of Chandler fails to show or suggest an elongated hollow tubular member containing an elongated supply of



Serial No.: 09/586,484

pyrotechnic gas generant material reactable to produce a supply of gas, the tubular member having a length to diameter ratio greater than 20 and including a plurality of longitudinally-spaced apart gas exit orifices wherethrough at least a portion of the supply of gas provided by reaction of the pyrotechnic gas generant material can be expelled from the tubular member.

Moreover, claim 8 has been rewritten above to specifically require that the elongated diffuser device have first and second opposed lateral ends and also have first and second longitudinal ends. Such an inflation assembly is clearly not shown by the proposed combination of Hamilton in view of Chandler. For example, the outer tube 96 of Hamilton does not have longitudinal ends as required of the claimed elongated diffuser device.

In view thereof, claim 8 and claim 9 which is dependent thereon are believed patentable over the art of record and notification to that effect is solicited.

Claim 13 requires an inflation assembly comprising:

an inflator comprising an elongated hollow tubular member containing an elongated supply of pyrotechnic gas generant material reactable to produce a supply of gas, the tubular member having a length to diameter ratio greater than 20 and including a plurality of longitudinally-spaced apart gas exit orifices wherethrough at least a portion of the supply of gas provided by reaction of the pyrotechnic gas generant material can be expelled from the tubular member and

an elongated discharge treatment element having a length and secured with the tubular member at selected positions along the length of the tubular member, the discharge treatment element effective to treat at least a portion of the gas expelled from the tubular member contacting thereagainst and to deform to create spaced apart gas flow paths between the tubular member and the treatment element, the gas flow paths spaced apart along the length of the tubular member and the length of the treatment element, the treatment element also directing at least a portion of gas expelled from the tubular member into an associated inflatable device.

As submitted above, Hamilton in view of Chandler fails to show or suggest such an inflator. In particular, Hamilton in view of Chandler fails to show or suggest an elongated hollow tubular member containing an elongated supply of pyrotechnic gas generant material reactable to produce a supply of gas, the tubular member having a length to diameter ratio greater than 20 and including a plurality of longitudinally-spaced apart gas exit orifices wherethrough at least a portion of the supply of gas provided by reaction of the pyrotechnic gas generant material can be expelled from the tubular member.

It is further noted that claim 13 requires the discharge treatment element deform to create spaced apart gas flow paths between the tubular member and the treatment element. Claim 13 also requires that the gas flow paths be spaced apart along the length of the tubular member and the length of the treatment element.

It is respectfully submitted that such spacing apart of gas flow paths between such a tubular member and such a treatment element is not shown or suggested by the combination of Hamilton in view of Chandler. In particular, the spacing apart of such gas flow paths between such a tubular member and such a treatment element is not shown in Hamilton wherein, it appears, that a single flow path is formed between the confining member 52 and the timing member 96. See Hamilton, FIGS. 6A-6D, for example.

In view thereof, claim 13 is believed patentable over the art of record and notification to that effect is solicited.

Claims 11, 12, 14, 15 and 25 each depends, directly or indirectly, on claim 13. As claim 13 is believed to be patentable over the prior art of record, as discussed above, so too claims 11, 12, 14, 15 and 25 which are each dependent thereon are also believed to be patentable thereover and notification to that effect is solicited.

In addition, claims 12 and 25 each requires the elongated hollow tubular member to be arcuate. As submitted above, an arcuate elongated hollow tubular member is nowhere shown or suggested by Hamilton or Chandler. Thus, claims 12 and 25 are believed to be further patentable over the prior art of record.

Claim 16 requires an inflation assembly comprising:

5                   an elongated inflator adapted to provide a gas-containing discharge through selected locations spaced along the length of the inflator;

10                   an elongated discharge treatment element secured with the inflator at selected positions along the length of the inflator and the length of the discharge treatment element, respectively, the discharge treatment element effective to treat at least a portion of the gas discharged from the inflator contacting thereagainst and to deform to create spaced apart gas flow paths between the inflator and the treatment element, the gas flow paths spaced apart along the length of the inflator and the length of the treatment element, respectively; and

15                   an inflatable curtain airbag cushion in inflation fluid communication with the inflator.

20                   Thus, claim 16, similar to claim 13, requires the discharge treatment element deform to create spaced apart gas flow paths between the tubular member and the treatment element. Claim 16 also requires that the gas flow paths be spaced apart along the length of the tubular member and the length of the treatment element.

25                   As submitted above with respect to claim 13, such spacing apart of gas flow paths between such a tubular member and such a treatment element is not shown or suggested by the combination of Hamilton in view of Chandler. In particular, the spacing apart of such gas flow paths between such a tubular member and such a treatment element is not shown in Hamilton wherein, it appears, that a single flow path is formed between the confining member 52 and the timing member 96. See Hamilton, FIGS. 6A-6D, for example.

In view thereof, claim 16 is believed patentable over the art of record and notification to that effect is solicited.

Claims 17-19 each depends, directly or indirectly, on claim 16. As claim 16 is believed to be patentable over the prior art of record, as discussed above, so too  
5 claims 17-19 which are each dependent thereon are also believed to be patentable thereover and notification to that effect is solicited.

In addition, claim 18 requires the elongated hollow tubular member to be arcuate. As submitted above, an arcuate elongated hollow tubular member is nowhere shown or suggested by Hamilton or Chandler. Thus, claim 18 is believed  
10 to be further patentable over the prior art of record.

Claims 21 and 24 are independent claims directed to specified methods of inflating an inflatable device.

Claim 21 requires:

15                    reacting an elongated supply of pyrotechnic gas generant material within an elongated hollow tubular member of an inflator having a length to diameter ratio greater than 20 to produce a supply of gas along the length of the tubular member, and  
                     expelling at least a portion of the supply of gas through  
20                    selected locations spaced along the length of the inflator, wherein, subsequent to expulsion from the tubular member, the method additionally comprises:  
                     treating at least a portion of supply of expelled gas to form a treated gas, the treating step including,

contacting expelled gas onto an elongated treatment  
element adjacent the inflator and  
deforming the treatment element to create spaced apart  
gas flow paths between the inflator and the treatment element, the gas  
flow paths spaced apart along the respective lengths of the inflator and  
the treatment element; and  
directing the treated gas through the spaced apart gas flow  
paths into the inflatable device.

As submitted above, such spacing apart of gas flow paths between such  
an inflator and such a treatment element is not shown or suggested by the combination  
of Hamilton in view of Chandler. In particular, the spacing apart of such gas flow  
paths between such an inflator and such a treatment element is not shown in Hamilton  
wherein, it appears, that a single flow path is formed between the confining member  
52 and the timing member 96. See Hamilton, FIGS. 6A-6D, for example.

In view thereof, claim 21 and claim 23 which is dependent thereon are  
believed patentable over the art of record and notification to that effect is solicited.

Claim 24 requires:

reacting an elongated supply of pyrotechnic gas generant  
material within an elongated hollow tubular member of an inflator  
having a length to diameter ratio greater than 20 to produce a supply of  
gas along the length of the tubular member, and  
expelling at least a portion of the supply of gas through  
selected locations spaced along the length of the inflator,  
wherein, prior to reaction of the pyrotechnic gas generant  
material, the hollow tubular member is bent to conform to an associated  
inflator-accepting site in an automotive vehicle in which the inflator is  
placed.

While the Action asserts that “It would have been obvious to one of ordinary skill in the art at the time the invention was made to include bending the tubular inflator to conform to a particular site in the vehicle,” such bending is not believed to be shown or suggested in either Hamilton or in Chandler. In this regards  
5 it is noted that Chandler specifically identifies that it is directed to a hybrid gas generator **“with an elongated tubular construction.”** (See Chandler, column 1, lines 5-8, for example, emphasis added.) Moreover, Hamilton specifically identifies the use of an elongated body of propellant (column 13, lines 47-57, for example) and further:

10  
15  
20  
There is a substantial uniform entry of inflation gases about the cross-section of the inflatable 24, as well as a uniform entry along the entire length of the inflatable 24. Such uniform entry of inflation gases is associated with a desired, related filling of the inflatable 24 by means of the predetermined spacing and sizing of the metering orifices 100. As seen in FIG. 6D, the inflatable uniformly receives inflation gases and is uniformly filled or pressurized throughout its volume by means of the timing member 96. (See Hamilton, column 15, lines 58-66.)

20  
Clearly, such uniform entry of the inflation gases and uniform filling or pressurization does not contemplate, prior to reaction of the pyrotechnic gas generant material, the bending of the hollow tubular member which contains an elongated supply of pyrotechnic gas generant material to conform to an associated

Serial No.: 09/586,484

inflator-accepting site in an automotive vehicle in which the inflator is placed, as required by claim 24.

Still further, FIG. 7 of Hamilton clearly show a linear placement of the gas generating apparatus thereof.

5 In view thereof, claim 24 is believed to be patentable over the art of record and notification to that effect is solicited.

10 2. Claims 2 and 4 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hamilton in view Chandler, and further in view of U.S. Patent 5,845,933 to Walker et al. (hereinafter "Walker").

15 Claim 2 depends directly on claim 13 and requires that at least a portion of the supply of pyrotechnic gas generant material comprise a plurality of cylindrical annular-shaped grains axially aligned end to end along the length of the tubular member. Claim 4 depends directly on claim 2 and requires that the cylindrical annular-shaped grains form an internal cavity longitudinally extending substantially through the supply of pyrotechnic gas generant material, the inflator additionally comprising an elongated ignition article extending within the internal cavity.

20 As the shortcomings of Hamilton and Chandler relative to underlying claim 13 are not overcome by the further combination of Walker therewith, claims 2



and 4 are believed to be patentable over the prior art of record and notification to that effect is solicited.

- 5           3.     Claim 3 was rejected under 35 U.S.C. §103(a) as being unpatentable over Hamilton in view Chandler and Walker and further in view of U.S. Patent 6,068,290 to Sheng (hereinafter "Sheng").

10                     Claim 3 depends indirectly on claim 13. As the shortcomings of the proposed combination of Hamilton and Chandler relative to claim 13 and the proposed combination of Hamilton, Chandler and Walker relative to claim 2 are not believed overcome by the further proposed combination of either Sheng therewith, claim 3 is believed allowable over the prior art of record and notification to that effect is solicited.

4.     Claims 5 and 6 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hamilton in view Chandler and further in view of U.S. Patent 5,551,724 to Armstrong III et al. (hereinafter "Armstrong").

5                     Claims 5 and 6 each depend directly or indirectly on claim 13. As the shortcomings of the proposed combination of Hamilton and Chandler relative to claim 13 are not believed overcome by the further proposed combination of Armstrong therewith, claims 5 and 6 are believed allowable over the prior art of record and notification to that effect is solicited.

Moreover, claim 5 requires that the inflation assembly include a gas diffusible containment member within the elongated hollow tubular member and directly adjacently surrounding at least a portion of the supply of pyrotechnic gas generant material.

5                Such inclusion of a gas diffusible containment member within the elongated hollow tubular member and directly adjacently surrounding at least a portion of the supply of pyrotechnic gas generant material, is not believed to be shown or suggested by Armstrong.

10              Thus, claims 5 and 6 are believed allowable over the prior art of record and notification to that effect is solicited.

15              5.        Claims 22 and 26 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hamilton in view Chandler and further in view of U.S. Patent 4,158,696 to Wilhelm et al. (hereinafter "Wilhelm").

20              Claim 22 depends on claim 21 and claim 26 depends on claim 24. As the shortcomings of the proposed combination of Hamilton and Chandler relative to claims 21 and 24 are not believed overcome by the further proposed combination of Wilhelm therewith, claims 22 and 26 are believed to be allowable over the prior art of record and notification to that effect is solicited.

Serial No.: 09/586,484

Moreover, claims 22 and 26 each requires that the elongated supply of pyrotechnic gas generant material react substantially simultaneously. Such substantially simultaneous react is in sharp contrast to Hamilton which describes and explains the linear ignition that occurs therein. See Hamilton, column 2, lines 48-54 and column 13, lines 58-63, for example.

Thus, claims 22 and 26 are believed allowable over the prior art of record and notification to that effect is solicited.

#### **Newly Added Claims**

Claims 27-29 have been added.

Claim 27 is dependent on claim 8 and further requires the elongated diffuser device and the inflator to be secured together at at least one location between the first and second lateral ends of the elongated diffuser device.

Such an inflation assembly is clearly not shown or suggested by Hamilton, either alone or in combination with Chandler. Further, the securing of the timing member 96 to the confining member 52 in Hamilton would appear to hinder the desired performance of the Hamilton apparatus by preventing or complicating the linear ignition process described therein.

Claim 28 is dependent on claim 13 and further requires that the discharge treatment element have first and second opposed lateral ends and also have

first and second longitudinal ends. With the addition of this claim, the difference between the discharge treatment element of the claimed assembly and the confining member of the Hamilton apparatus may be better or more easily appreciated. An inflation assembly having a discharge treatment element, as herein claimed, is clearly not shown or suggested by Hamilton.

Claim 29 is dependent on claim 24 and further requires, where the discharge treatment element has first and second opposed lateral ends and also has first and second longitudinal ends, that:

in a static state, the first and second longitudinal ends of the discharge treatment element contact the tubular member, and

upon activation, the first and second longitudinal ends of the discharge treatment element deform away from the tubular member to form spaced apart gas flow paths extending: 1) between the tubular member and each of the first and second longitudinal ends of the discharge treatment element, and 2) into the inflatable device.

Serial No.: 09/586,484

With the addition of this claim, the difference between inflating an inflatable device via an assembly having such a discharge treatment element and operation of the Hamilton apparatus may be better or more easily appreciated. A method of inflating an inflatable device an inflation assembly wherein:

5                   in a static state, the first and second longitudinal ends of the discharge treatment element contact the tubular member, and

                  upon activation, the first and second longitudinal ends of the discharge treatment element deform away from the tubular member to form spaced apart gas flow paths extending: 1) between the tubular member and each of the first and second  
10                   longitudinal ends of the discharge treatment element, and 2) into the inflatable device, is not believed to be shown or suggested by Hamilton, either alone or in combination with the cited prior art.

In view thereof, claims 27-29 are believed allowable over the prior art of record and notification to that effect is solicited.

15

Serial No.: 09/586,484

### **Conclusion**

5 It is believed that all pending claims in condition for allowance and notification to that effect is solicited. However, should the Examiner detect any remaining issue or have any question, the Examiner is kindly requested to contact the undersigned, preferably by telephone, in an effort to expedite examination of the application.

Respectfully submitted,



Nick C. Kottis  
Regis. No. 31,974

Pauley Petersen & Erickson  
2800 West Higgins Road  
Suite 365  
Hoffman Estates, Illinois 60195  
PHONE: (847) 490-1400  
FAX: (847) 490-1403